

Amendments to the Claims:

This listing of claims will replace all prior versions and listings of claims in the application:

Listing of Claims:

1. **(Currently Amended)** A method for identifying ~~an OP-1 receptor~~ a binding analog for a receptor of a morphogen, said morphogen being characterized as sharing at least 60% identity or 70% homology to the C-terminal 102 amino acids of SEQ ID NO: 7, and being able to substitute for OP-1 in binding to SEQ ID NOs. 4, 6, or 8, said analog being characterized as having substantially the same binding affinity for a cell surface said morphogen receptor as OP-1 said morphogen, the method comprising ~~the steps of:~~
- (a) providing a sample without a Type II serine/threonine kinase morphogen receptor ~~but~~ containing a protein selected from ~~the group consisting of:~~
- (i) a polypeptide chain comprising an amino acid sequence defined by residues 16-123 of ~~Seq. ID No. 3~~ SEQ ID NO: 4 (ALK-2), or an OP-1-binding receptor analog thereof;
 - (ii) a polypeptide chain comprising an amino acid sequence defined by residues 24-152 of ~~Seq. ID No. 5~~ SEQ ID NO: 6 (ALK-3), or an OP-1-binding receptor analog thereof;
 - (iii) a polypeptide chain comprising an amino acid sequence defined by residues 23-122 of ~~Seq. ID No. 7~~ SEQ ID NO: 8 (ALK-6), or an OP-1-binding receptor analog thereof;
 - (iv) a polypeptide chain having binding affinity for OP-1 and sharing at least 40% amino acid identity with residues 23-122 of ~~Seq. ID No. 7~~ SEQ ID NO: 8 (ALK-6);
 - (v) a polypeptide chain having binding affinity for OP-1 and encoded by a nucleic acid obtainable by amplification with one or more primer sequences defined by ~~Seq. ID Nos.~~ SEQ ID NOs: 12-15; or
 - (vi) a polypeptide chain having binding affinity for OP-1 and encoded by a nucleic acid that hybridizes under stringent conditions with a nucleic acid comprising the sequence defined by nucleotides 256-552 of ~~Seq. ID No. 7~~ SEQ ID NO: 8 (ALK-6);

- (b) contacting said sample with a candidate ~~OP1~~ morphogen receptor-binding analog; and
- (c) detecting specific binding between said candidate ~~OP1~~ morphogen receptor-binding analog and said protein;

wherein binding of said candidate morphogen receptor-binding analog to said protein is indicative that said candidate analog is a morphogen receptor-binding analog.

2. **(Currently Amended)** A method for identifying an OP-1 receptor-binding analog, said analog being characterized as having substantially the same binding affinity for a cell surface receptor as OP₁, the method comprising ~~the steps of:~~

- (a) providing a cell that expresses a surface receptor protein having binding specificity for OP-1 selected from ~~the group consisting of:~~
 - (i) a polypeptide chain comprising an amino acid sequence defined by residues 16-123 of ~~Seq. ID No. 3~~ SEQ ID NO: 4 (ALK-2), or an OP₁-binding receptor analog thereof;
 - (ii) a polypeptide chain comprising an amino acid sequence defined by residues 24-152 of ~~Seq. ID No. 5~~ SEQ ID NO: 6 (ALK-3),, or an OP₁-binding receptor analog thereof;
 - (iii) a polypeptide chain comprising an amino acid sequence defined by residues 23-122 of ~~Seq. ID No. 7~~ SEQ ID NO: 8 (ALK-6),, or an OP₁ binding receptor analog thereof;
 - (iv) a polypeptide chain having binding affinity for OP-1 and sharing at least 40% amino acid identity with residues 23-122 of ~~Seq. ID No. 7~~ SEQ ID NO: 8 (ALK-6),;
 - (v) a polypeptide chain having binding affinity for OP-1 and encoded by a nucleic acid obtainable by amplification with one or more primer sequences defined by ~~Seq. ID Nos.~~ SEQ ID NOS: 12-15; or
 - (vi) a polypeptide chain having binding affinity for OP-1 and encoded by a nucleic acid that hybridizes under stringent conditions with a nucleic acid comprising the sequence defined by nucleotides 256-552 of ~~Seq. ID No. 7~~ SEQ ID NO: 8 (ALK-6),;
- (b) contacting said cell with a candidate OP₁ receptor-binding analog; and

(c) detecting induction of an OP-1-mediated cellular response;
wherein detection of induction of said OP-1-mediated cellular response is indicative that said candidate analog is an OP-1 receptor-binding analog.

3. **(Original)** The method of claim 2 wherein said OP-1 mediated cellular response detected in step (c) is induction of a kinase activity, inhibition of epithelial cell growth, or induction of a cell differentiation marker.

4. **(Currently Amended)** The method of claim 2 or 3 wherein said cell comprises a transfected nucleic acid comprising a reporter gene in operative association with a control element derived from an OP-1 inducible protein, and wherein the activity of said reporter gene can be detected as said OP-1-mediated cellular response upon stimulation by OP-1 or analog thereof in said cell.

5. **(Currently Amended)** The method of ~~any of claims 1-4~~ claim 2 or 3, wherein said ~~sample~~ said surface receptor protein further comprises part or all of a Type II serine/threonine kinase receptor protein having binding affinity for OP-1, activin or BMP-4.

6-7. **(Canceled)**

8. **(Currently Amended)** A kit for identifying OP-1 or a candidate OP-1 receptor binding analog in a sample, the kit comprising:

(a) a receptacle adapted to receive a said sample, said receptacle ~~and~~ containing a protein selected from ~~the group consisting of:~~

(i) a polypeptide chain comprising an amino acid sequence defined by residues 16-123 of ~~Seq. ID No. 3~~ SEQ ID NO: 4 (ALK-2), or an OP-1-binding receptor analog thereof;

(ii) a polypeptide chain comprising an amino acid sequence defined by residues 24-152 of ~~Seq. ID No. 5~~ SEQ ID NO: 6 (ALK-3), or an OP-1-binding receptor analog thereof;

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- (iii) a polypeptide chain comprising an amino acid sequence defined by residues 23-122 of ~~Seq. ID No. 7~~ SEQ ID NO: 8 (ALK-6),; or an OP-1 binding receptor analog thereof;
 - (iv) a polypeptide chain having binding affinity for OP-1 and sharing at least 40% amino acid identity with residues 23-122 of ~~Seq. ID No. 7~~ SEQ ID NO: 8 (ALK-6);
 - (v) a polypeptide chain having binding affinity for OP-1 and encoded by a nucleic acid obtainable by amplification with one or more primer sequences defined by ~~Seq. ID Nos.~~ SEQ ID NOs: 12-15; or
 - (vi) a polypeptide chain having binding affinity for OP-1 and encoded by a nucleic acid that hybridizes under stringent conditions with a nucleic acid comprising the sequence defined by nucleotides 256-552 of ~~Seq. ID No. 7~~ SEQ ID NO: 8 (ALK-6);; and
 - (b) means for detecting induction of an OP-1-mediated cellular response as a means for detecting interaction of OP-1 or a candidate OP-1 receptor-binding analog with said protein of part (a), said OP-1 or candidate analog comprising part of said sample provided to said receptacle.

9. (Canceled)

10. (Currently Amended) The kit of claim 8, ~~or 9~~ further comprising a serine/threonine Type II receptor having binding specificity for OP-1, activin or BMP-4.

11-27. (Canceled)

28. (New) The method of claim 1, wherein said morphogen is OP-1.

29. (New) The method of claim 1, wherein said morphogen is 60A, DPP, OP-2, OP-3, BMP-2, BMP-4, BMP-5, BMP-6, Vg1, GDF-1, or Vgr-1.

30. (New) The method of claim 4, wherein said surface receptor protein further comprises part or all of a Type II serine/threonine kinase receptor protein having binding affinity for OP-1, activin or BMP-4.

31. (New) A kit for identifying a binding analog for a receptor of a morphogen in a sample, said morphogen being characterized as sharing at least 60% identity or 70% homology to the C-terminal 102 amino acids of SEQ ID NO: 7, and being able to substitute for OP-1 in binding to SEQ ID NOs. 4, 6, or 8, the kit comprising:

- (a) a receptacle adapted to receive said sample, said receptacle does not contain a Type II serine/threonine kinase morphogen receptor but contains a protein selected from:
- (i) a polypeptide chain comprising an amino acid sequence defined by residues 16-123 of SEQ ID NO: 4 (ALK-2), or an OP-1-binding receptor analog thereof;
 - (ii) a polypeptide chain comprising an amino acid sequence defined by residues 24-152 of SEQ ID NO: 6 (ALK-3), or an OP-1-binding receptor analog thereof;
 - (iii) a polypeptide chain comprising an amino acid sequence defined by residues 23-122 of SEQ ID NO: 8 (ALK-6), or an OP-1 binding receptor analog thereof;
 - (iv) a polypeptide chain having binding affinity for OP-1 and sharing at least 40% amino acid identity with residues 23-122 of SEQ ID NO: 8 (ALK-6);
 - (v) a polypeptide chain having binding affinity for OP-1 and encoded by a nucleic acid obtainable by amplification with one or more primer sequences defined by SEQ ID NOs: 12-15; or
 - (vi) a polypeptide chain having binding affinity for OP-1 and encoded by a nucleic acid that hybridizes under stringent conditions with a nucleic acid comprising the sequence defined by nucleotides 256-552 of SEQ ID NO: 8 (ALK-6); and
- (b) means for detecting specific binding interaction of OP-1 or said candidate analog with said protein of part (a), said OP-1 or candidate analog comprising part of said sample provided to said receptacle.

32. (New) The method of claim 1, wherein said protein is a polypeptide chain comprising an amino acid sequence defined by residues 16-123 of SEQ ID NO: 4 (ALK-2).

33. (New) The method of claim 1, wherein said protein is a polypeptide chain comprising an amino acid sequence defined by residues 24-152 of SEQ ID NO: 6 (ALK-3).
34. (New) The method of claim 1, wherein said protein is a polypeptide chain comprising an amino acid sequence defined by residues 23-122 of SEQ ID NO: 8 (ALK-6).
35. (New) The method of claim 2, wherein said surface receptor protein is a polypeptide chain comprising an amino acid sequence defined by residues 16-123 of SEQ ID NO: 4 (ALK-2).
36. (New) The method of claim 1, wherein said surface receptor protein is a polypeptide chain comprising an amino acid sequence defined by residues 24-152 of SEQ ID NO: 6 (ALK-3).
37. (New) The method of claim 1, wherein said surface receptor protein is a polypeptide chain comprising an amino acid sequence defined by residues 23-122 of SEQ ID NO: 8 (ALK-6).
38. (New) The kit of claim 8 or claim 31, wherein said protein is a polypeptide chain comprising an amino acid sequence defined by residues 16-123 of SEQ ID NO: 4 (ALK-2).
39. (New) The kit of claim 8 or claim 31, wherein said protein is a polypeptide chain comprising an amino acid sequence defined by residues 24-152 of SEQ ID NO: 6 (ALK-3).
40. (New) The kit of claim 8 or claim 31, wherein said protein is a polypeptide chain comprising an amino acid sequence defined by residues 23-122 of SEQ ID NO: 8 (ALK-6).
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